



UNIVERSITI PUTRA MALAYSIA

**A STUDY ON USERS' PERCEPTION TOWARDS CASH
CARD USAGE IN UPM**

MAIZATUL AKMAR ISMAIL

FSKTM 2001 11

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**MASTER SAINS
UNIVERSITI PUTRA MALAYSIA
2001**



A STUDY ON USERS' PERCEPTION TOWARDS CASH CARD USAGE IN UPM

By

MAIZATUL AKMAR BINTI ISMAIL

**Thesis Submitted in Fulfilment of the Requirement for the Degree of Master of
Science in the Faculty of Computer Science and Information Technology
Universiti Putra Malaysia**

May 2001



To Allah , the Almighty and to everybody who helped and encouraged me in finishing
this research.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of
the requirement for the degree of Master of Science

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MAIZATUL AKMAR ISMAIL

May 2001

Chairman : Associate Professor Hj Mohd Hasan Selamat

Faculty : Computer Science and Information Technology

One of the most important significance in the emergence of e-commerce is the development of electronic payment system. This system replaces physical banknote and coins and substitutes them with electronic cash or digital cash. Smart cards used in electronic cash transactions are referred to stored-value cards or electronic purse i.e. the card will be considered as the repository for money. Units of value are stored on the card as the electronic equivalent of cash and later used for purchases. It can also be used to store value as credits for goods and services - for example, ticketing or canteen facilities.

The introduction of new electronic payment scheme for substituting cash especially in Malaysia may be considered in its early age. The Malaysian Electronic Payment System (MEPS) has introduced MEPS Cash smart card as a new method of payment in the middle of year 1999. The method is expected to handle the rapid changes of technological advancement in creating the cashless society. However, consumer

acceptances towards the new method of payment has not so far being tested. The consumer preference of using cash for personal consumption expenditures is still widening. On the other hand, money suffers from a few drawbacks that make it no longer practical as it took a lot of space, it cannot be transferred by any means of telecommunication network and finally, high transaction cost for handling money.

This research was conducted in order to find a business model for a new method of payment i.e. by using smart card and to solve some of the existing problems that arise when using money in conventional way. The second objective of this research was to develop a smart card application prototype for the mentioned business model. This research focused on measuring user acceptance for the developed prototype and user perception towards the smart card as stored value card.

The smart card business model, was then translated into a system, which showed the flow of the processes in smart card transaction. The processes clearly showed what happened between the three parties involved in the system: smart card user, merchant and bank. Selected students from the Faculty of Computer Science and Information Technology, UPM then evaluated the system by completing a questionnaire. The questionnaire intended to obtain the general background of the respondents, their attitudes towards smart card usage, acceptance towards cash card illustrated transaction processes. It was also aimed to obtain respondents' opinion if the smart card as stored value card were introduced in the near future.

The result showed that the respondents are actually agreed and satisfied with the system in terms of its clarity and user interface. The findings also ascertained that it

could increase the respondents' perception regarding reliability and level of convenience towards the usage of smart card. The fact that more than ninety percent of the respondents were willing to use the smart card for shopping indicated that consumer have no problem in accepting such system in the future.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

KAJIAN PERSEPSI PENGGUNA TERHADAP PENGGUNAAN KAD TUNAI DI UPM

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Sistem pembayaran elektronik adalah salah satu kepentingan yang wujud dari kemunculan e-dagang. Sistem ini menggantikan wang kertas serta syiling dan menggantikannya dengan wang elektronik atau wang digital. Kad pintar yang digunakan dalam transaksi wang elektronik dikenali sebagai kad simpanan nilai ataupun dompet elektronik iaitu kad diandaikan sebagai repositori untuk wang. Unit-unit nilai yang tersimpan di dalam kad adalah bersamaan dengan wang tunai dan akan digunakan kemudiannya untuk tujuan pembayaran atau pembelian. Ia juga boleh digunakan untuk menyimpan nilai kredit untuk barangan dan perkhidmatan contohnya tiketing dan kemudahan membeli makanan di kantin.

Pengenalan kepada skim pembayaran baru berasaskan elektronik untuk menggantikan wang tunai terutamanya di Malaysia boleh dikategorikan sebagai berada di peringkat awal. Malaysian Electronic Payment System (MEPS) telah memperkenalkan MEPS Cash pada pertengahan tahun 1999. Cara pembayaran baru ini

diharapkan dapat mengendalikan perubahan pesat teknologi dalam mewujudkan masyarakat tanpa wang tunai. Namun demikian penerimaan konsumen terhadap kaedah pembayaran baru ini masih belum diuji. Kecenderungan pengguna menggunakan wang tunai masih lagi meluas. Wang, mempunyai banyak kelemahan yang menjadikannya tidak lagi praktikal seperti ia memerlukan banyak ruang, tidak boleh dipindahkan melalui rangkaian telekomunikasi serta kos transaksi yang tinggi untuk tujuan pengendalian.

Penyelidikan ini dijalankan untuk mencari model perniagaan yang untuk kaedah pembayaran yang baru iaitu dengan menggunakan kad pintar dan juga untuk menyelesaikan beberapa masalah yang timbul akibat penggunaan wang secara konvensional. Objektif kedua penyelidikan ini adalah untuk menghasilkan satu prototaip aplikasi kad pintar untuk model perniagaan yang dicadangkan. Fokus penyelidikan ini adalah untuk menguji penerimaan pengguna terhadap prototaip yang dibangunkan dan persepsi mereka terhadap kad pintar sebagai kad simpanan nilai.

Model perniagaan berasaskan kad pintar kemudiannya diterjemahkan dalam bentuk sistem yang menunjukkan aliran proses-proses dalam transaksi kad pintar. Proses-proses itu menunjukkan apa yang berlaku diantara tiga pihak yang terlibat di dalam sistem iaitu konsumen, peniaga dan bank. Pelajar-pelajar terpilih dari Fakulti Sains Komputer dan Teknologi Maklumat, UPM kemudiannya menilai sistem tersebut dengan menjawab soalan soal selidik yang diedarkan. Borang soal selidik itu adalah bertujuan untuk mendapatkan maklumat latar belakang responden, sikap mereka terhadap penggunaan kad pintar, penerimaan responden terhadap ilustrasi proses

transaksi berasaskan kad pintar serta pandangan mereka jika kad pintar untuk membeli-belah diperkenalkan di masa hadapan.

Keputusan yang didapati menunjukkan responden secara amnya bersetuju dan berpuas hati dengan sistem dari segi kejelasan dan antara muka penggunaanya. Hasil kajian selidik juga menunjukkan bahawa sistem yang dibangunkan dapat meningkatkan persepsi positif responden terutamanya terhadap kebolehpercayaan dan keselesaan terhadap penggunaan kad pintar. Lebih sembilan puluh peratus daripada responden setuju menggunakan kad pintar untuk membeli-belah menunjukkan bahawa responden bersedia menerima sistem yang sedemikian pada masa hadapan.

ACKNOWLEDGEMENTS

In the name of Allah the Most Beneficent and the Most Merciful. Alhamdullillah and thanks to Almighty Allah for giving me the opportunity and the ability to continue my study, and the patience in completing this research.

I would like to thank my supervisor Associate Professor Hj Mohd Hasan Selamat for his commitment, his invaluable guidance, understanding, help and encouragement. Many discussion, support and contribution have accompanied this work. Thank you for everything and I would like to express my highest gratitude for all the time he has spent in finishing this study.

I would also like to thank Dr Abdul Azim Abdul Ghani and Encik Abu Bakar Md Sultan for their assistance and guidance throughout research period. Their assistance helped me to improve many aspect of this thesis.

I would like to express my highest appreciation to all respondents involve in evaluating the PayEZ Smart Card System. Their comments and critics helped me to enhance the work.

Finally, I would like to thank my friends who accompany me along the way of the research period. The highest appreciation also goes to my family member especially abah, Ismail Bin Jusoh and mak, Wan Zainab Bt Wan Jaafar whose love and Doa' have

provided me with the strong foundation for the successfulness of this research. Last but not least, to my beloved husband, Azmi Bin Ramli, thank you for everything.

I certify that an Examination Committee met on 15th May 2001 to conduct the final examination of Maizatul Akmar Ismail on her Master of Science thesis entitled “A Study on Users’ Perception Towards Cash Card Usage in UPM” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulation 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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DECLARATION FORM

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.



MAIZATUL AKMAR ISMAIL

Date : 11th July 2001

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CHAPTER 1

INTRODUCTION

1.0 Background

Cash payment is the most popular form of money transfer used today, but as the amounts get larger and security becomes an issue, people are less inclined to hold their wealth in the form of cash and start to use the services of a financial institution such as a bank (O'Mahony *et al*, 1997)

1.1 The Concept of Cash

Depending on the country involved, somewhere between 75% and 95% of all transactions are paid in cash, even though the value of these transactions are for the most part quite low (Craig, 1998). It is difficult to pinpoint exactly what attributes of cash make it attractive, but they would undoubtedly include the following:

1. Acceptability: Cash is almost universally acceptable as a form of payment, regardless of the transaction amount (Grabbe, 1996).
2. Guaranteed payment: One of the reasons why cash is so acceptable is that the physical handing over of the cash completes the transaction and there is no risk that the payment will not be honoured at a later stage (Wyner, 1997).
3. No transaction charges: Cash can be handed from person to person, with no charges

levied. There is no authorization required and, consequently, no communications traffic or charges (Godin, 1995).

4. **Anonymity:** Many other forms of payment involve a paper trail linking either or both parties with the transaction. Cash allows transactions to take place anonymously. In addition to being attractive to criminals, this also has appeal for perfectly honest consumers that are worried about the ability of large organizations to monitor their movements and lifestyle (Matonis,1995; Godin,1995, Grabbe,1996, Wyner,1997, Stalling,1998).

1.2 The Emergence of Electronic Commerce

With the rapid movement of cash all over the world, commerce has been the most important activity that has been modernized from time to time. Because of that, electronic commerce emerges to substitute the old tradition of handling business. Goods and services began being traded on the network, without the use of any supporting technology. Sokol (1995) define e-commerce as the sharing of business information using a wide variety of different technologies , between organization doing business with one another; customers, suppliers, banks and government agencies . According to Zwass (1997), electronic commerce (E-commerce) is the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunications networks . He added that the principal technologies directly enabling modern E-commerce are: computer networking and telecommunications; client/server computing; multimedia, and hypermedia in particular; information retrieval systems, electronic data interchange (EDI), message handling and

workflow management systems, groupware and electronic meeting systems and public key cryptography.

One of the most important significance in the emerging of e-commerce is the development of electronic payment system. This system replaces physical banknote and coins and substitutes them with electronic cash or digital cash. Electronic cash can offer such benefits as the anonymity of the buyer, global acceptance, and divisibility that can cost-effectively go beyond that of real cash especially in the case of micropayments. The term 'electronic money' is used to encompass both chip-based stored-value cards and net-based payment mechanisms that store and convey value in and of themselves rather than merely representing value residing elsewhere, such as a deposit account (Stalling, Van Slyke, 1998).

1.3 The Concept of Smart Card as Stored Value Card

Smart card is the generic term; it includes cards with a wide range of smartness and a variety of applications. Smart cards used in electronic cash transactions are referred to as stored-value cards or electronic purse (Matonis, 1994) i.e. the card will be considered the repository for the money. Units of value are stored on the card as the electronic equivalent of cash and later used for purchases. It can also be used to store value as credits for goods and services - for example, ticketing or canteen facilities. Smart cards are increasingly being used as loyalty cards to provide incentives to customers by storing a token value when purchases are made - the electronic equivalent of trading stamps.

More sophisticated smart cards; can be recharged with value. Other types of card are discarded when the credits are used up. In either case it removes the handling and record keeping associated with collection, collating or issuing of cash or items of value.

1.4 The Problems of Ordinary Money

The introduction of new electronic payment scheme for substituting cash especially in Malaysia may be considered in its early age. The Malaysian Electronic Payment System (MEPS) has introduced MEPS Cash smart card as a new method of payment in the middle of year 1999. The method is expected to handle the rapid changes of technological advancement in creating the cashless society. However, consumer acceptances towards that method of payment has not so far being tested.

Why then is smart card technology not yet prevalent? Resistance to the adoption of interactive smart card technology is rooted in the dominance of existing magnetic stripe cards as well as in companies' failure to recognize the immense potential of the smart card. Evidence is now mounting, however, that impediments to smart card explosion are rapidly crumbling. In fact, smart cards are rapidly finding acceptance worldwide. At present, some 200 application are utilized by 39 countries, mostly in the field of telecommunication (Kaplan, 1996). Here prepaid telephone cards have resulted in more frequent use of the pay phones as the instruments; are reliable, because it could no longer broken into by thieves, and callers talk longer when freed from anxiety of providing exact and sufficient change.

The consumer preference of using cash for personal consumption expenditures is still widening. The Nilson Report estimates that in the year 2000, cash will still be used in almost half of such expenditure (Violino, Lipin, 1993) . Thus, money suffers from a few drawbacks that make it no longer practical as it took a lot of space, it cannot be transferred by any means of telecommunication network and finally, there is high transaction cost for handling money (Grabbe,1996). Due to the mentioned problem, another form of payment method should be created to overcome the deficiency of ordinary money.

1.5 Research Objectives

This research has been conducted in order to find a new business model for a new method of payment using smart card. It is also to solve some of the existing problem that arises when using money in conventional way. The aims of this research are:

1. Developing a business model for smart card as stored value card
2. To develop a smart card application prototype for cash card business model.
3. To measure user acceptance for the developed prototype and user perception towards the cash card.

1.6 Research Methodology

The thesis focuses on building a business model for smart card as stored value card and building a prototype to prove that the business model can be adapted in the

current environment. The business model is called PayEZ Business Model and the prototype is called PayEZ Smart Card application. The main contribution of this thesis is providing the result of users' perception and acceptance in adapting smart card as cash card. The strategy to achieved this task involves the following steps:

1. Conducting a survey on the existing electronic payment method in order to get a good understanding and to determine the advantages and disadvantages of those systems.
2. Introducing a business model for smart card as stored value card, which includes the positive aspects of the selected electronic transaction method.
3. Specifying the features of PayEZ Smart Card application based on the conducted survey and introduced model.
4. Developing a system to illustrate PayEZ Smart Card transaction system.
5. Measuring the user acceptance towards the prototype and their perception if this prototype is introduced in the near future by conducting a questionnaire.

1.7 Research Scope

This research will cover a cash card survey among students in Faculty of Computer Science and Information Technology. Selected students will be chose to test a prototype for cash card transaction in a virtual cafeteria and answer a questionnaire regarding the prototype and their perception towards the usage of cash card.